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**Planting the P and F1 Generation for our Wisconsin Fast Plant Genetics Project**

Osbourn Park, AP Biology

**Wisconsin Fast Plant Genetics (Phenotypes and Genotypes):**

Rapid-cycling Brassica rapa (also known as RCBr or the Wisconsin Fast Plant) is often used in genetics experiments for several reasons. First, it has a very rapid life cycle and generation time, thus results of crosses are relatively quick. Further, many of the fast plant traits follow a simple autosomal inheritance pattern (just like many traits seen in Mendel’s pea plants). In this long-term genetics experiment, you will completing a dihybrid cross of two parental generation fast plants to produce an F1 generation and then crossing those seeds to produce an F2 generation. The two traits that will be tracked are explained in more detail below. For time purposes, we have conducted the cross of the two parental generation plants for you to get the F1 seeds. We will be planting the two types of parental generation seeds (P1 and P2) to observe their traits. We will also be planting the F1 seeds to observe their traits, pollinate them, and collect the F2 generation seeds that result from this pollination. Then, we will plant the F2 generation seeds to observe their traits. The two traits that we are going to be investigating—stem color and leaf color—are described below.

Anthocyanin is a purple pigment found in many plants, including Wisconsin Fast Plants. Anthocyanin is best observed when the plants are 4-7 days old (which is when we will begin to record data). A single gene in Wisconsin Fast Plants regulates whether or not anthocyanin will be created. Plants that make anthocyanin will have purple stems, and plants that do not make anthocyanin will have non-purple (green) stems. You will not know which trait (purple or non-purple) is dominant and which trait is recessive until we observe the plants as they grow.

Another gene Wisconsin Fast Plants determines whether the leaves will be green or yellow-green in color. You will not know which trait (green or yellow-green) is dominant and which trait is recessive until we observe the plants as they grow. We know that the one parent is homozygous dominant for both traits (AABB) and one parent is homozygous recessive for both traits (aabb). This means that the F1 “children” will all have the heterozygous genotype for both traits (AaBb). As such, we will be able to determine which allele (i.e., purple or non-purple) is dominant and which allele is recessive for stem color by observing the stem color that is seen in the F1 “children.” We will also be able to determine which allele (i.e. green or yellow-green) is dominant and which allele is recessive for leaf color by observing the leaf color that is seen in the F1 “children.”

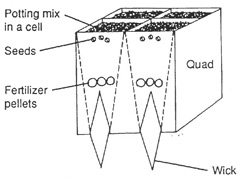
“Father” Generation (P2)

“Mother” Generation (P1)

Child Generation (F1)

Grandchild Generation (F2)

**Procedure for planting:**

1. Your lab group will be assigned to plant one of the following groups/generations of seeds: P1, P2 or F1. You will be planting one quad of your assigned seed type.
2. Place a wick in each cell of your quad so that the tip extends hallway out of the hole at the bottom. Then fill each cell halfway with potting soil.
3. Add three fertilizer pellets to each cell and then fill the rest of the cell with soil. Avoid packing down the soil.
4. Press lightly on the soil in each cell to make a shallow dip/depression. Place two or three seeds in the dip.
5. Sprinkle enough soil over each dip to cover the seeds. Water each cell with distilled water using an eyedropper (pipet) until water begins to drip from the wick.
6. On a plant label, write your period, table number and plant type. Example: If you are in fourth period, sit at table 3 and are planting the P2, then your label would be as follows: “43P2”. Stick this label in your quad.

\*Note: Only one label is needed per quad, NOT per cell.

1. When you have finished, place your quad on one of the designated water containers that will keep it moist.

**Looking to the future:**

1. Once the plants have begun to grow we will be collecting the following data to be analyzed at the end of the project.
   1. Stem color of the P1, P2, F1 and F2 generation plants
   2. Leaf color of the P1, P2, F1 and F2 generation plants
   3. Some quantitative trait from the F1 generation (ex: plant height)
2. We will combine your class’s data to form a large data set and then combine all AP Biology classes’ data to have a more reliable set of numbers to analyze at the end of the project.
3. When we begin data collection, you will be responsible for compiling and keeping track of all data the class collects. A set of data tables will be provided at the time of data collection, you are responsible filling in these tables. In addition, you will want to take photographs of the results to be used in the Lab Report at the end of the project.